

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended): A method for fabricating a magnetic head including a spin valve sensor, comprising the steps of:

fabricating a first electrical insulation layer (G1) above a first magnetic shield layer (S1);
fabricating a plurality of spin valve sensor layers above said G1 layer, said spin valve sensor layers including a seed layer, a PtMn antiferromagnetic layer, at least one pinned magnetic layer and at least one free magnetic layer;

wherein said seed layer is a three part seed layer comprised of Al_2O_3 , NiMnO and NiFeCr, and wherein said NiFeCr seed layer has a rough top crystallographic surface that is rougher than a top crystallographic surface of a deposited NiFeCr seed layer.

2. (currently amended): A method for fabricating a magnetic head as described in claim 1 wherein said NiFeCr seed layer portion is fabricated to have a thickness of approximately 20 Å, and wherein said rough top crystallographic surface is formed by etching a previously deposited NiFeCr top surface.

3. (original): A method for fabricating a magnetic head as described in claim 1 wherein said spin valve sensor layers include at least one pinned magnetic layer having a composition including CoFe and at least one spacer layer having a composition including Cu, and at least one free magnetic layer having a composition including NiFe.

1 4. (original): A method for fabricating a magnetic head as described in claim 1 wherein the
2 Cr concentration of said NiFeCr layer is from approximately 35 at.% to approximately 46 at.%.

1 5. (original): A method for fabricating a magnetic head as described in claim 4 wherein the
2 Cr concentration of said NiFeCr layer is approximately 38 at.%.

1 6. (original): A method for fabricating a magnetic head as described in claim 5 wherein the
2 composition of said NiFeCr layer is approximately $\text{Ni}_{49.5} \text{Fe}_{12.5} \text{Cr}_{38}$.

1 7. (withdrawn): A method for fabricating a magnetic head including a spin valve sensor,
2 comprising the steps of:

3 fabricating a first electrical insulation layer (G1) above a first magnetic shield layer (S1);
4 fabricating a plurality of spin valve sensor layers above said G1 layer, said spin valve
5 sensor layers including a seed layer, a PtMn antiferromagnetic layer, at least one pinned
6 magnetic layer and at least one free magnetic layer;

7 wherein said seed layer is comprised of Al_2O_3 , NiMnO, NiFeCr layer portions, and
8 wherein said NiFeCr layer is fabricated by depositing it to a first thickness and subsequently
9 etching it back to a final thickness before the fabrication of said PtMn layer.

1 8. (withdrawn): A method for fabricating a magnetic head as described in claim 7 wherein
2 said NiFeCr layer is fabricated to have a final thickness of from approximately 10 Å to
3 approximately 40 Å.

1 9. (withdrawn): A method for fabricating a magnetic head as described in claim 8 wherein
2 said NiFeCr seed layer is fabricated to have a final thickness of from approximately 15 Å to
3 approximately 35 Å.

1 10. (withdrawn): A method for fabricating a magnetic head as described in claim 9 wherein
2 said NiFeCr layer is fabricated to have a final thickness of approximately 20 Å.

1 11. (withdrawn): A method for fabricating a magnetic head as described in claim 7 wherein
2 said first thickness of said NiFeCr layer is from approximately 15 Å to approximately 45 Å and
3 it is etched back a thickness of from approximately 5 Å to approximately 15 Å.

1 12. (withdrawn): A method for fabricating a magnetic head as described in claim 11 wherein
2 said first thickness is approximately 30 Å and said final thickness is approximately 20 Å.

1 13. (withdrawn): A method for fabricating a magnetic head as described in claim 7 wherein
2 said spin valve sensor layers include at least one pinned magnetic layer having a composition
3 including CoFe and at least one spacer layer having a composition including Cu, and at least one
4 free magnetic layer having a composition including NiFe.

1 14. (withdrawn): A method for fabricating a magnetic head as described in claim 7 wherein
2 the Cr concentration of said NiFeCr layer is from approximately 35 at.% to approximately 46
3 at.%.

1 15. (withdrawn): A method for fabricating a magnetic head as described in claim 14 wherein
2 the Cr concentration of said NiFeCr layer is approximately 38 at.%.

1 16. (withdrawn): A method for fabricating a magnetic head as described in claim 15 wherein
2 the composition of said NiFeCr layer is approximately $\text{Ni}_{49.5} \text{Fe}_{12.5} \text{Cr}_{38}$.

1 17. (withdrawn): A method for fabricating a magnetic head as described in claim 7 wherein
2 said first thickness is from 15 to 45 Å, and it is etched back a thickness of from 5 to 15 Å, and
3 wherein the Cr concentration of said NiFeCr layer composition is from approximately 35 at.% to
4 approximately 46 at.%.

1 18. (currently amended): A magnetic head including a spin valve sensor comprising:
2 a magnetic shield layer (S1) being fabricated above a substrate base;
3 a first electrical insulation layer (G1) being fabricated above said S1 layer;
4 a spin valve sensor structure being disposed above said G1 layer;
5 wherein said spin valve sensor structure includes a seed layer being fabricated above said
6 G1 layer, a PtMn layer being disposed above said seed layer and at least one pinned magnetic
7 layer and at least one free magnetic layer being disposed above said PtMn layer; and
8 wherein said seed layer includes an Al_2O_3 layer, an NiMnO layer, and an NiFeCr layer,
9 and wherein said NiFeCr seed layer has a rough top crystallographic surface that is rougher than
10 a top crystallographic surface of a deposited NiFeCr seed layer.

1 19. (original): A magnetic head as described in claim 18 wherein said NiFeCr layer is
2 formed with a thickness of approximately 20 Å.

1 20. (original): A magnetic head as described in claim 18 wherein the Cr concentration of
2 said NiFeCr layer is from approximately 35 at.% to approximately 46 at.%.

1 21. (original): A magnetic head as described in claim 19 wherein the Cr concentration of
2 said NiFeCr layer is approximately 38 at.%.

1 22. (original): A magnetic head as described in claim 21 wherein the composition of said
2 NiFeCr layer is approximately Ni_{49.5} Fe_{12.5} Cr₃₈.

1 23. (currently amended): A magnetic head including a spin valve sensor comprising:
2 a magnetic shield layer (S1) being fabricated above a substrate base;
3 a first electrical insulation layer (G1) being fabricated above said S1 layer;
4 a spin valve sensor structure being disposed above said G1 layer;
5 wherein said spin valve sensor structure includes a seed layer being fabricated above said
6 G1 layer, a PtMn layer being disposed above said seed layer and at least one pinned magnetic
7 layer and at least one free magnetic layer being disposed above said PtMn layer; and
8 wherein said seed layer ~~has an upper surface~~ comprised of NiFeCr having ~~an etched~~
9 ~~crystalline structure~~ a rough top crystallographic surface that is rougher than a top
10 crystallographic surface of a deposited NiFeCr seed layer.

1 24. (original): A magnetic head as described in claim 23 wherein said NiFeCr layer is
2 formed with a thickness of from approximately 10 Å to approximately 40 Å.

1 25. (original): A magnetic head as described in claim 23 wherein said NiFeCr seed layer is
2 formed with a thickness of from approximately 15 Å to approximately 35 Å.

1 26. (original): A magnetic head as described in claim 23 wherein said NiFeCr layer is
2 formed with a thickness of approximately 20 Å.

1 27. (original): A magnetic head as described in claim 23 wherein the Cr concentration of
2 said NiFeCr layer is from approximately 35 at.% to approximately 46 at.%.

1 28. (original): A magnetic head as described in claim 27 wherein the Cr concentration of
2 said NiFeCr layer is approximately 38 at.%.

1 29. (original): A magnetic head as described in claim 28 wherein the composition of said
2 NiFeCr layer is approximately $\text{Ni}_{49.5} \text{Fe}_{12.5} \text{Cr}_{38}$.

1 30. (original): A magnetic head as described in claim 23 wherein said spin valve sensor
2 structure includes at least one PtNm antiferromagnetic layer, at least one pinned magnetic layer
3 having a composition which includes CoFe, at least one spacer layer having a composition which
4 includes Cu, and at least one free magnetic layer having a composition which includes NiFe.

1 31. (currently amended): A hard disk drive, including at least one magnetic head having a
2 read head portion comprising:

3 a magnetic shield layer (S1) being fabricated above a substrate base;

4 a first electrical insulation layer (G1) being fabricated above said S1 layer;

5 a spin valve sensor structure being disposed above said G1 layer;

6 wherein said spin valve sensor structure includes a seed layer being fabricated above said
7 G1 layer, a PtMn layer being fabricated above said seed layer and at least one pinned magnetic
8 layer and at least one free magnetic layer; and

9 wherein said seed layer includes an Al_2O_3 layer, an NiMnO layer and an NiFeCr layer,
10 and wherein said NiFeCr seed layer has a top surface with a rough crystallographic surface that
11 is rougher than a top crystallographic surface of a deposited NiFeCr seed layer.

1 32. (original): A hard disk drive as described in claim 31 wherein said NiFeCr layer has a
2 thickness of approximately 20 Å.

1 33. (original): A hard disk drive as described in claim 31 wherein the Cr concentration of
2 said NiFeCr layer is from approximately 35 at.% to approximately 46 at.%.

1 34. (original): A hard disk drive as described in claim 33 wherein the Cr concentration of
2 said NiFeCr layer is approximately 38 at.%.

1 35. (original): A hard disk drive as described in claim 34 wherein the composition of said
2 NiFeCr layer is approximately $\text{Ni}_{49.5}\text{Fe}_{12.5}\text{Cr}_{38}$.

1 36. (currently amended): A hard disk drive, including at least one magnetic head having a
2 read head portion comprising:

3 a magnetic shield layer (S1) being fabricated above a substrate base;

4 a first electrical insulation layer (G1) being fabricated above said S1 layer;

5 a spin valve sensor structure being disposed above said G1 layer;

6 wherein said spin valve sensor structure includes a seed layer being fabricated above said
7 G1 layer, a PtMn layer being fabricated above said seed layer and at least one pinned magnetic
8 layer and at least one free magnetic layer; and

9 wherein said seed layer has an upper surface comprised of NiFeCr having ~~an etched~~
10 ~~crystalline structure~~ a rough top crystallographic surface that is rougher than a top
11 crystallographic surface of a deposited NiFeCr seed layer.

1 37. (original): A hard disk drive as described in claim 36 wherein NiFeCr seed layer is
2 formed with a thickness of from approximately 10 Å to approximately 40 Å.

1 38. (original): A hard disk drive as described in claim 36 wherein said NiFeCr seed layer is
2 formed with a thickness of from approximately 15 Å to approximately 35 Å.

1 39. (original): A hard disk drive as described in claim 36 wherein said NiFeCr layer is
2 formed with a thickness of approximately 20 Å.

1 40. (original): A hard disk drive as described in claim 36 wherein the Cr concentration of
2 said NiFeCr layer is from approximately 35 at.% to approximately 46 at.%.

1 41. (original): A hard disk drive as described in claim 40 wherein the Cr concentration of
2 said NiFeCr layer is approximately 38 at.%.
3

1 42. (original): A hard disk drive as described in claim 41 wherein the composition of said
2 NiFeCr layer is approximately $\text{Ni}_{49.5} \text{Fe}_{12.5} \text{Cr}_{38}$.
3

1 43. (original): A hard disk drive as described in claim 36 wherein said spin valve sensor
2 structure includes at least one PtNm antiferromagnetic layer, at least one pinned magnetic layer
3 having a composition which includes CoFe, at least one spacer layer having a composition which
4 includes Cu, and at least free magnetic layer having a composition which includes NiFe.
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